Claims.

1. A process for recovering predetermined metal values from a metal containing material including the predetermined metal values comprising:

digesting the metal containing material in a sulfuric acid solution comprising:

sulfuric acid;

a reducing agent; and

a carbon source;

for a period of time sufficient to solubilize the predetermined metal values;

heating the digestion mixture for a period of time sufficient to attain 75-95 °C; and

separating the resulting solution from the remaining solids.

2. The process of claim 1 wherein the sulfuric acid solution further comprises hydrofluoric acid as a source of fluoride ion.

3. The process of claim 1 wherein the sulfuric acid solution comprises:

0.09 to 0.4 pounds of concentrated sulfuric acid per pound of metal containing material solids (dry basis);

0.01 to 0.03 pounds of a reducing agent per pound of metal containing material solids (dry basis);

0.01 to 0.03 pounds of a carbon source per pound of metal containing material solids (dry basis); and

sufficient water to make a solution of 5 to 15% sulfuric acid in water.

4. The process of claim 3 wherein the sulfuric acid solution further comprises:

0.05 to 0.2, pounds of at least 50% hydrofluoric acid (HF) as a source of fluoride ion.

5. The process of claim 3 wherein the sulfuric acid solution comprises:

0.33 pounds of concentrated sulfuric acid per pound of solids (dry basis);

0.02 pounds of a reducing agent per pound of solids (dry basis);

0.02 pounds of a carbon source per pound of solids (dry basis) and

sufficient water to make a solution of 11% in sulfuric acid.

6. The process of claim 5 wherein the sulfuric acid solution further comprises:
0.12 pounds per pound of solids (dry basis) 70% hydrofluoric acid (HF) as a source of fluoride ion.

7. The process of claim 3 further comprising the step of cooling the heated digestion mixture and wherein:
the metal containing material is digested for at least 1 hour in the sulfuric acid solution;
the digestion mixture is heated to above 75° C, for at least 0.5 hour;
the resulting mixture is cooled to below 60° C;
and the resulting solution is separated by filtering.

8. The process of claim 4 further comprising the step of cooling the heated digestion mixture and wherein:
the metal containing material is digested for at least 1 hour in the sulfuric acid solution;
the digestion mixture is heated to above 75° C, for at least 0.5 hour;
the resulting mixture is cooled to below 60° C;
and the resulting solution is separated by filtering.

9. The process of claim 1 further comprising the following steps after the separation step:
washing the separated undissolved solids with a volume of water equal to the volume of the resulting solution separated (the filtrate) and
recycling the wash water into the sulfuric acid solution utilized in the digestion step.

10. The process of claim 3 wherein the reducing agent is iron.

11. The process of claim 4 wherein the reducing agent is iron.

12. The process of claim 3 wherein the carbon source is activated carbon.

13. The process of claim 4 wherein the carbon source is activated carbon.